FIELD NOTE / ANDROID

Bypassing PairIP Integrity Checks

Petruknisme · 1 Dec, 2025 · 6 min to read

As mobile security researchers and penetration testers, one of our fundamental tasks is to intercept and analyze the network traffic of an application. While this is often straightforward for standard native apps, Flutter applications present a unique challenge due to their custom rendering engine and networking stack. A popular tool to overcome this is **reflutter**, which allows us to rebuild a Flutter APK to trust system-wide SSL CA certificates.

However, after successfully patching an app with **reflutter**, we can hit another roadblock: integrity checks. This article explores how **PairIP** detects the modified package and prevents the app from launching by displaying an “Integrity Check Failed” message.

Play Store

Get this app from Play



To continue using [redacted] get it on Google Play

Get app

This error can be fixed by uninstalling the Google Play Store update, but it will showing new error.

App info



Google Play Store

Version: 48.9.30-29 [0] [PR] 834517506

Storage 183 MB >

Data usage 0 B >

Battery 1.0% >

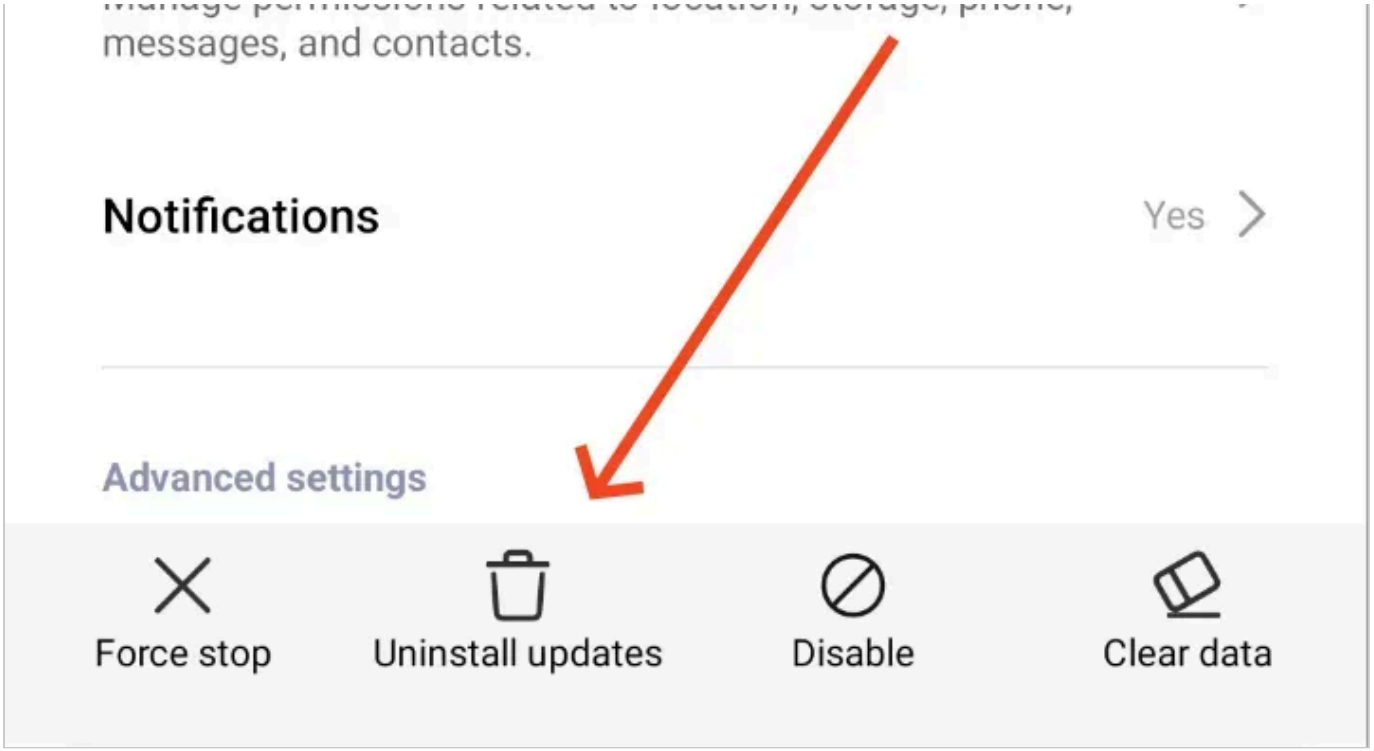
Permissions

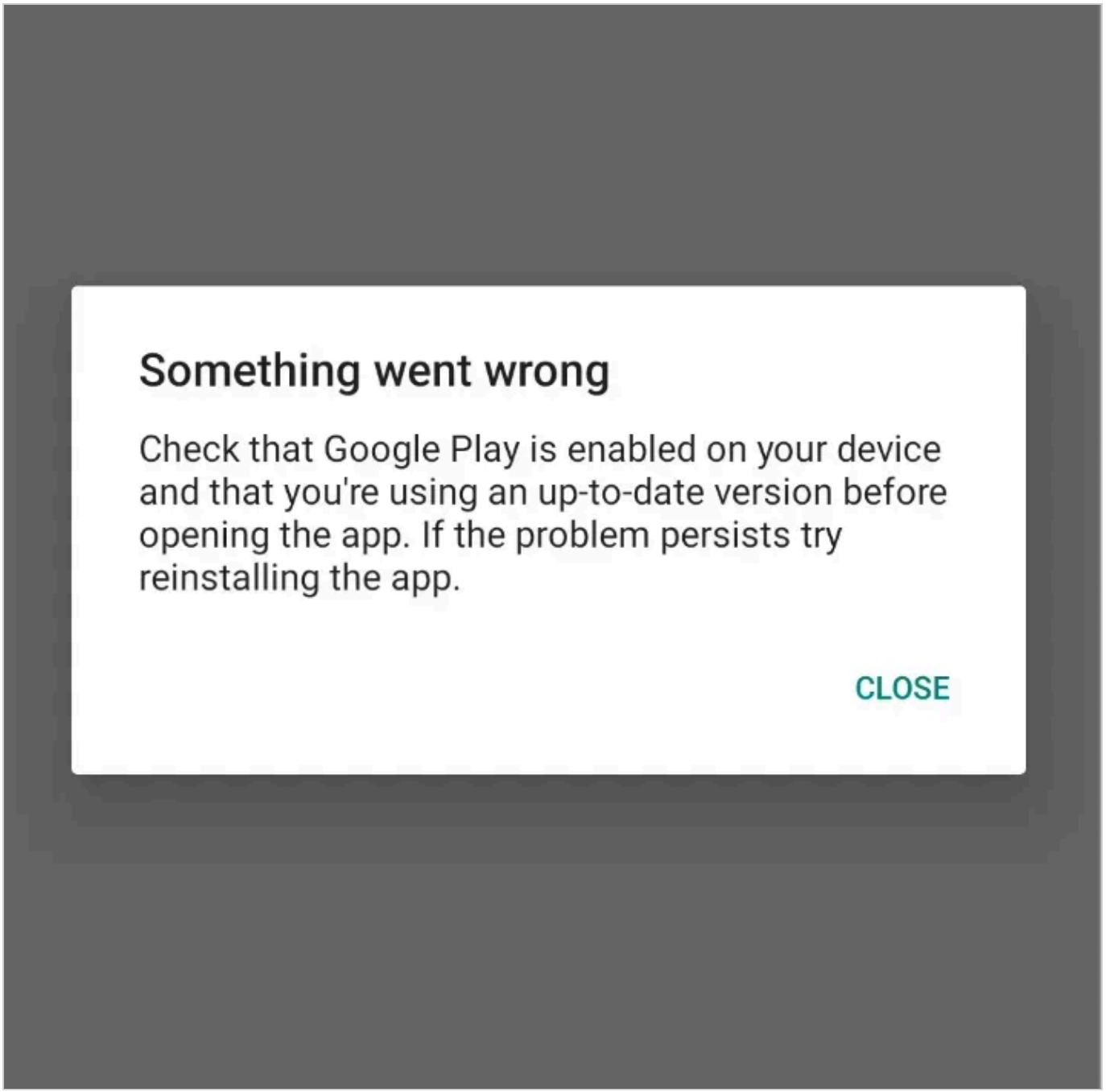
Pause app activity if unused

Remove permissions, delete temporary files, and stop notifications

App permissions

Manage permissions related to location, storage, phone >


messages, and contacts.
Notifications
Yes
Advanced settings
Force stop
Uninstall updates
Disable
Clear data



This popup effectively blocks all access to the application, making our reflutter patch useless. The popup is a clear indicator that the application is using **PairIP** to verify its code signature and integrity. When reflutter modifies the APK, the signature changes, causing the integrity check to fail as expected.

Our goal is to disable this check so we can proceed with our network traffic analysis.

Solution 1: Using LSPosed Module

For devices that use LSPosed, a practical approach is to rely on a module that adjusts how the target application handles PairIP's integrity verification. LSPosed provides a framework that allows behavior

to be modified at runtime without making any changes to the APK itself.

A module such as **pairipfix** able to bypass this mechanism. PairIP displays the “Get this app from Play” prompt and performs several runtime checks through its component called **pairipcore**, which is implemented inside the `libpairpcore.so` binary. This component confirms that the app was installed from Google Play, validates the app’s signature, and monitors for tools such as debuggers or instrumentation frameworks. It also rewrites specific application methods into an encrypted or obfuscated virtual machine format. Whenever a protected method is called, PairIP loads the corresponding VM code from the app’s storage and executes it inside its own virtual machine. Because the protected resources are required for the app to run correctly, blocking these calls outright would cause the app to crash.

Within LSPosed, a module can intercept the function that reports the result of PairIP’s integrity check and modify the returned value so the application treats the verification as successful. After installing and activating such a module in LSPosed and assigning the target app to its scope, the application typically launches without showing the integrity-check dialog, which allows it to run normally for analysis.

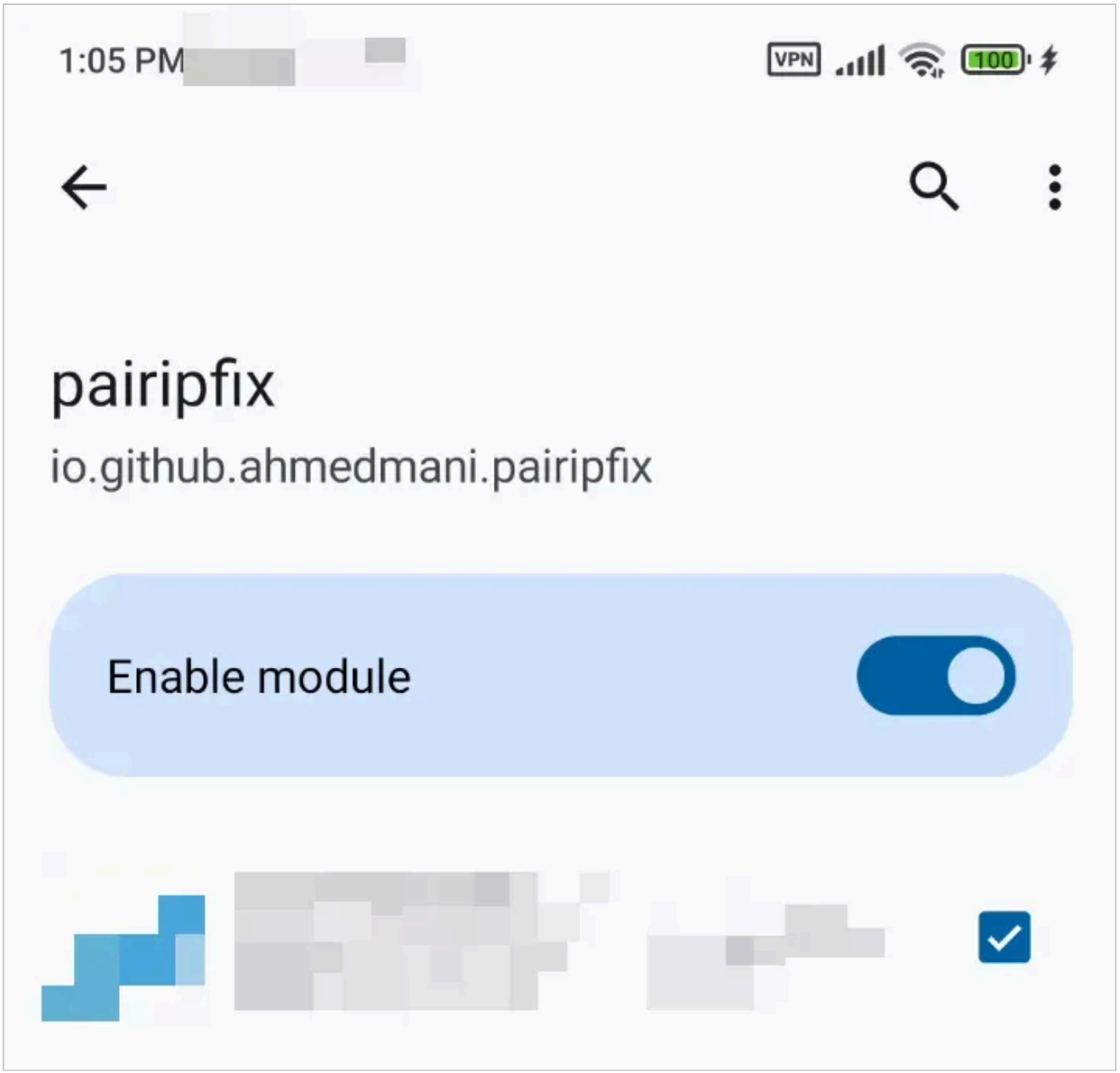
Step-by-Step Guide:

1. Install LSPosed via Magisk:

- First, ensure your device is rooted with a recent version of Magisk.
- I prefer to use JingMatrix LSPosed fork because it’s more updated https://github.com/JingMatrix/LSPosed/releases (https://github.com/JingMatrix/LSPosed/releases).
- Install the LSPosed Module and reboot.

2. **Install LSPosed Module**

- Download **Pairipfix** module from this https://github.com/ahmedmani/pairipfix (https://github.com/ahmedmani/pairipfix)
- Install the downloaded APK on your device. After installation, you should see a notification from LSPosed prompting you to activate the module.
- Open the LSPosed Manager app (it appears in your app drawer after the reboot), go to the Modules section, and ensure `pairipfix` is activated.
- Tap on the `pairipfix` module and select the target application (the one you patched with `reflutter`). This tells LSPosed to only apply this module to that specific app.
- Open the patched application again. The Pairip integrity check popup should now be gone, and the app should function normally.



Solution 2: Using Lucky Patcher to Remove License Verification

If you prefer not to use LSPosed or if it doesn't work for your specific case, **Lucky Patcher** offers another viable method. Lucky Patcher is a powerful, well-known tool for modifying Android applications. While often associated with license bypassing, its patching capabilities can also be used to defeat certain types of integrity checks.

This method works by applying generic patches that target and neutralize common license verification and anti-tamper mechanisms.

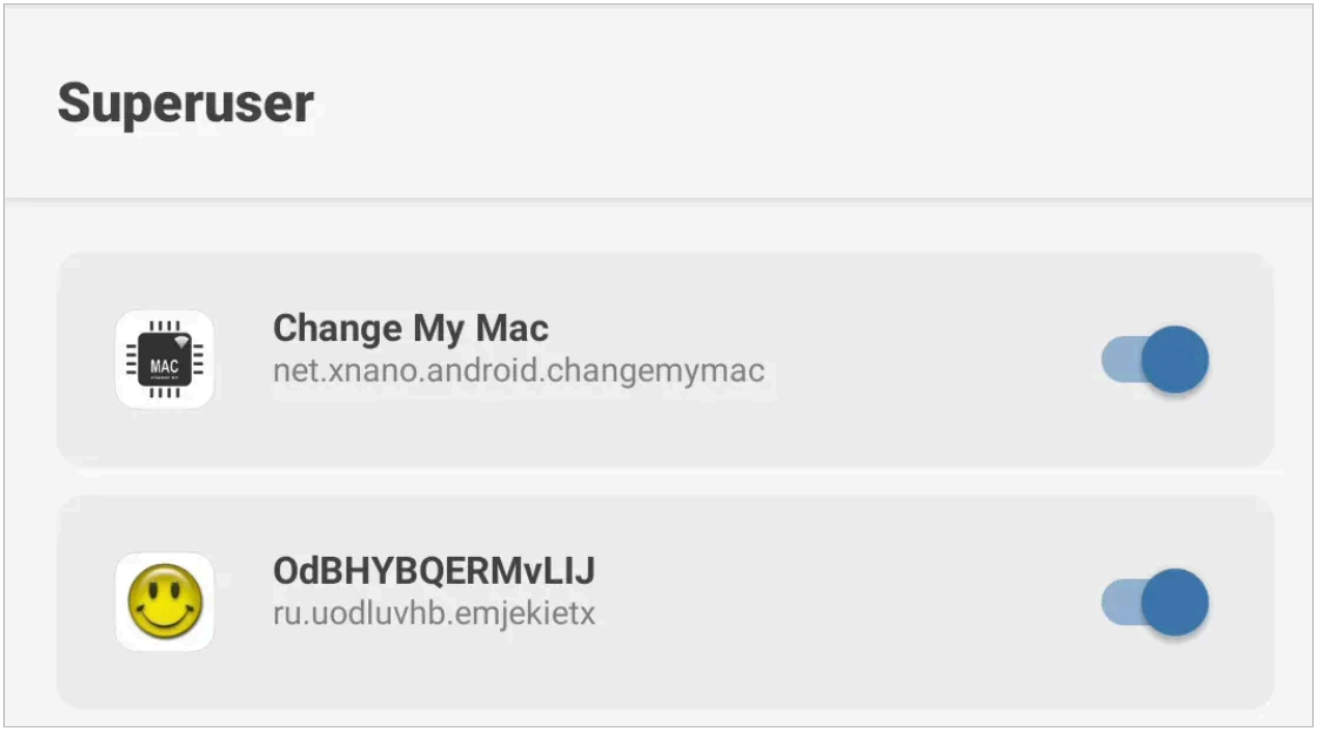
Step-by-Step Guide:

1. Install Lucky Patcher:

- Download and install latest Lucky Patcher from https://www.luckypatchers.com/download/ (https://www.luckypatchers.com/download/)

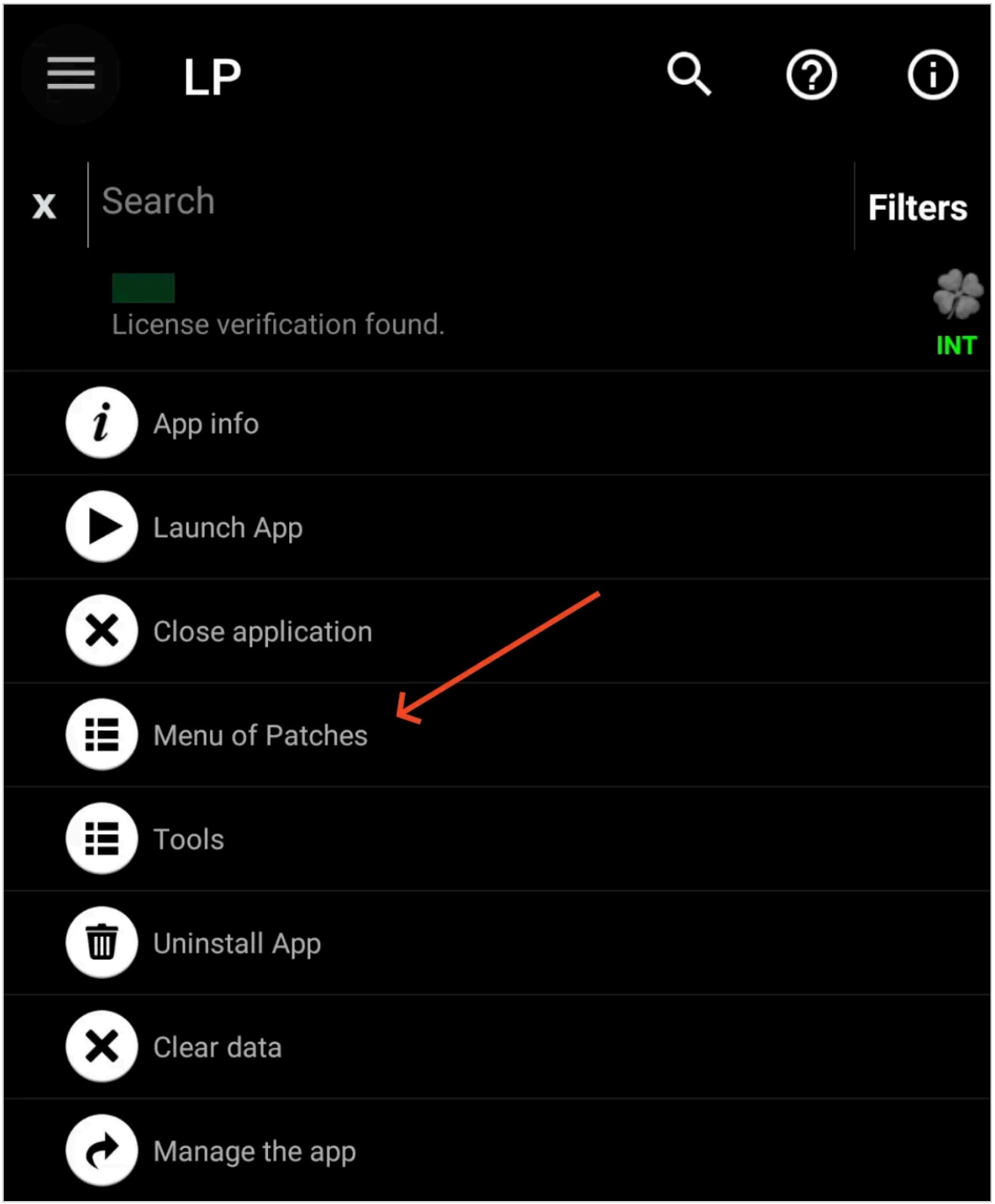
2. Grant Root Permission:

- Open Magisk Manager → Superuser and grant Lucky Patcher root permission

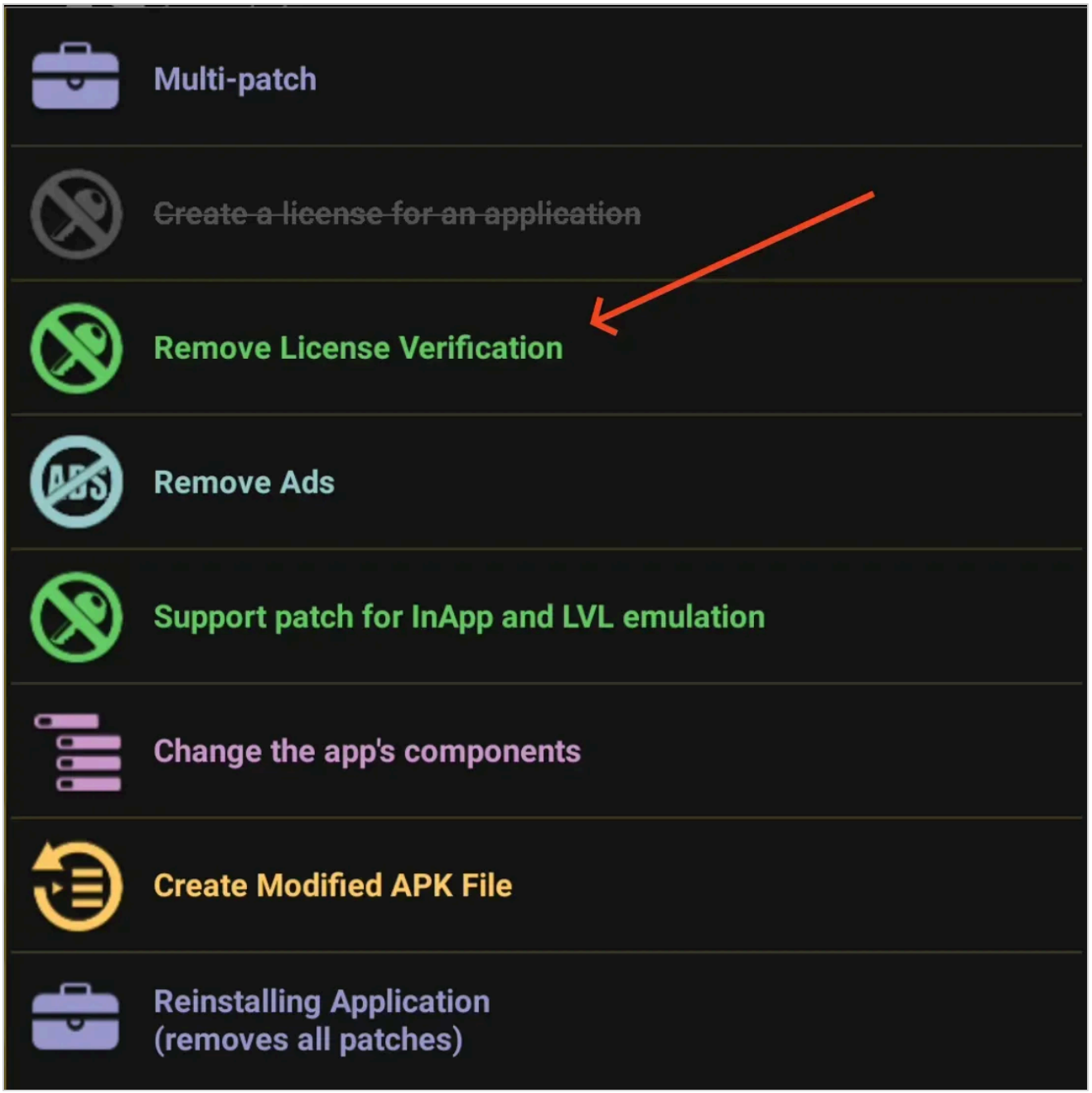


3. Patch APK:**

- Locate your reflutter-patched application in the list.
- Tap on the application and select **Menu of Patches**.

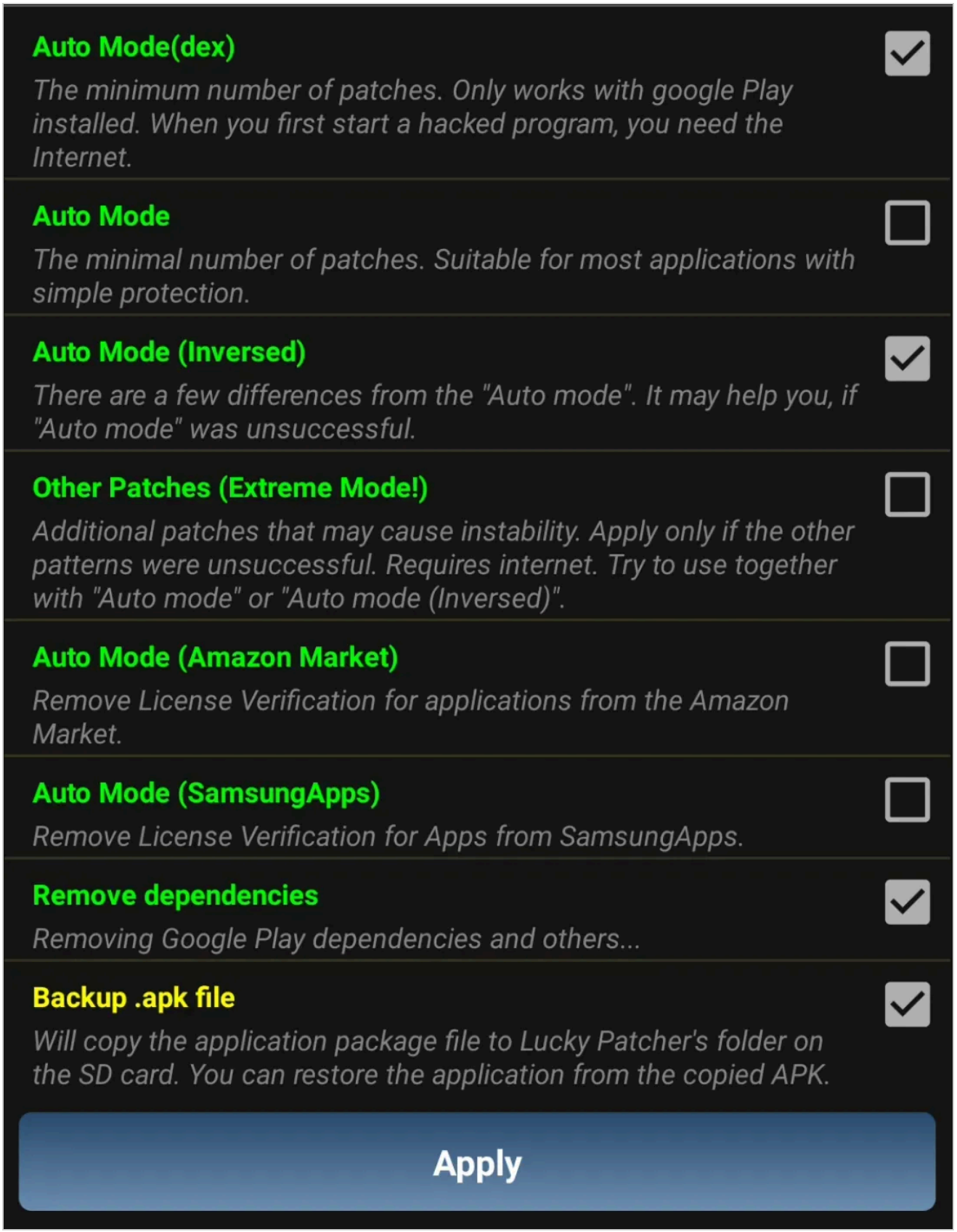


- Tap on Remove License Verification → Auto Mode

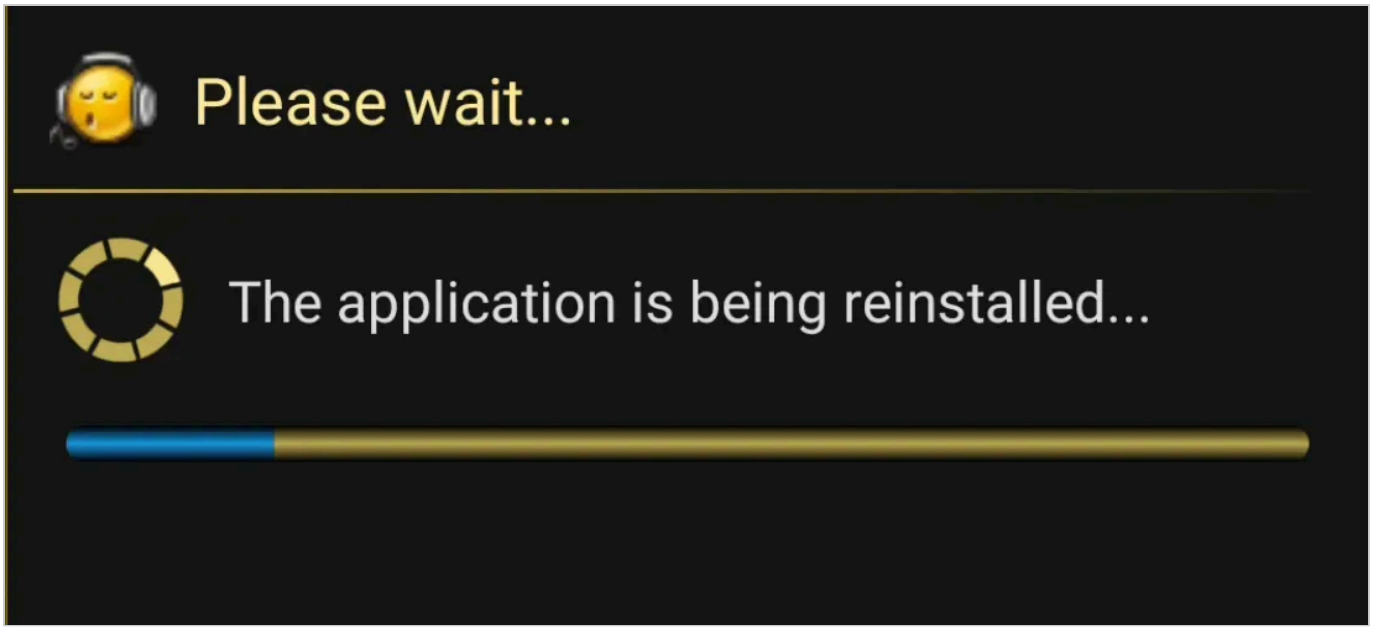


Select this options:

- Auto Mode(dex)
- Auto Mode(Inversed)
- Remove Dependencies
- Backup.apk file



It will then showing the patching progress



When finish, it will show the result like this



Patch results

Remove License Verification:

License verification killer added.

Patch Pattern N7 : Success. (28)

Amazon Market Patch failed...

SamsungApps Patch failed...

Patch Pattern N1 failed...

Patch Pattern N2 failed...

Patch Pattern N3 failed...

Patch Pattern N4 failed...

Patch Pattern N5 failed...

Patch Pattern N6 failed...

****

You have 28.0% Luck!
Please run the application to test the patch!

If the application works incorrectly, please reinstall it and do not try to patch this version of it.

Launch

Ok

Don’t worry if several patterns fail. This is expected, and as long as one pattern succeeds, it generally means the licensing logic has been effectively modified.

You can launch the patched app to test if the patch is success.

Solution 3: Manual Modification

PairIP is typically integrated into production builds in one of two ways. Identifying which method your target uses will quickly tell you whether a manifest adjustment is relevant or if a different approach is required.

- Some apps enforce the integrity check entirely in their Java/Kotlin layer. In those builds the check is registered via the manifest, so once you decompile the app you can open `AndroidManifest.xml`, search for the text pairip, and remove the entire component block. Most of the time it is a `<service>`, `<provider>`, or `<receiver>` with a `com.pairip` package name. After that component disappears the binary no longer boots the Pairip code, so once you rebuild and resign the APK the popup never appears.
- If you spot `libpairip.so` inside `lib/arm64-v8a` (or any ABI folder), the vendor pushed part of the protection into native code. That is a heavier integration, so a manifest tweak alone will not cut it.

For the scenario discussed in this article, the app happens to implement its integrity check in Java, meaning that a modification in the AndroidManifest.xml is sufficient. A more detailed workflow is as follows:

- Decompile with Apktool:

```
❯ apktool d release.RE.apk
I: Using Apktool 2.12.1 on release.RE.apk with 8 threads
I: Baksmaling classes.dex...
I: Baksmaling classes3.dex...
I: Baksmaling classes8.dex...
I: Baksmaling classes6.dex...
I: Baksmaling classes7.dex...
I: Loading resource table...
I: Baksmaling classes2.dex...
I: Baksmaling classes5.dex...
I: Decoding file-resources...
I: Loading resource table from file: /Users/petruknisme/Library/apktool/fr
I: Baksmaling classes4.dex...
I: Decoding values */* XMLs...
```

```
I: Decoding AndroidManifest.xml with resources...
I: Copying original files...
I: Copying assets...
I: Copying lib...
I: Copying unknown files...
```

- Edit AndroidManifest.xml:

Open target-dec/AndroidManifest.xml, locate the block referencing `com.pairip.*,` and delete the whole XML element (including child tags such as `<intent-filter>`). Save the file once all Pairip entries are gone.

In this case, here is the sample of AndroidManifest.xml code

AndroidManifest.xml

```
<service android:exported="false" android:name="com.google.android.datatra
        <receiver android:exported="false" android:name="com.google.androi
        <activity android:exported="false" android:name="com.pairip.licens
        <provider android:authorities="com.example.app.com.pairip.licensec
    </application>
<uses-permission android:name="com.android.vending.CHECK_LICENSE"/>
```

We need to remove the `<activity/>`, `<provider/>` and `<uses-permission/>` block. Because it contain the `pairip` check.

- Rebuild the project:

```
❯ apktool b release.RE
I: Using Apktool 2.12.1 on release.RE.apk with 8 threads
I: Checking whether sources have changed...
I: Smaling smali folder into classes.dex...
I: Checking whether sources have changed...
I: Smaling smali_classes2 folder into classes2.dex...
I: Checking whether sources have changed...
I: Smaling smali_classes3 folder into classes3.dex...
I: Checking whether sources have changed...
I: Smaling smali_classes4 folder into classes4.dex...
I: Checking whether sources have changed...
```

```
I: Smaling smali_classes5 folder into classes5.dex...
I: Checking whether sources have changed...
I: Smaling smali_classes6 folder into classes6.dex...
I: Checking whether sources have changed...
I: Smaling smali_classes7 folder into classes7.dex...
I: Checking whether resources have changed...
I: Building resources with aapt2...
I: Checking whether sources have changed...
I: Smaling smali_classes8 folder into classes8.dex...
I: Building apk file...
I: Importing assets...
I: Importing lib...
I: Importing unknown files...
I: Built apk into: release.RE/dist/release.RE.apk
```

- Sign the APK

```
❯ java -jar ~/Downloads/uber-apk-signer.jar -a release.RE.apk
source:
        /Users/petruknisme/Downloads/flutter-app/release.RE/dist
zipalign location: BUILT_IN
        /var/folders/_8/v5b47jgd4p529gtngdp1778c0000gn/T/uapksigner-154133
keystore:
        [0] 161a0018 /private/var/folders/_8/v5b47jgd4p529gtngdp1778c0000g

01. release.RE.apk

        SIGN
        file: /Users/petruknisme/Downloads/flutter-app/release.RE/dist/rel
        checksum: 2b9d6e33811a9978bf126fec4d78f9b9a4ef2c37741a45662d438b7a
        - zipalign success
WARNING: A restricted method in java.lang.System has been called
WARNING: java.lang.System::loadLibrary has been called by org.conscrypt.Na
WARNING: Use --enable-native-access=ALL-UNNAMED to avoid a warning for cal
WARNING: Restricted methods will be blocked in a future release unless nat

        - sign success

        VERIFY
```

```
23          file: /Users/petruknisme/Downloads/flutter-app/release.RE/dist/rel
24          checksum: 26562188e270170fe74058fc4006e3d181ef6cf48e9cedd282df9d9e
25          - zipalign verified
26          - signature verified [v2, v3]
27                  Subject: CN=Android Debug, OU=Android, O=US, L=US, ST=US,
28                  SHA256: 1e08a903aef9c3a721510b64ec764d01d3d094eb954161b625
29                  Expires: Fri Mar 11 03:10:05 WIB 2044
30
31  [Mon Dec 01 14:15:42 WIB 2025][v1.3.0]
32  Successfully processed 1 APKs and 0 errors in 1.26 seconds.
```

- Install the signed APK, launch it, and confirm that the Pairip integrity dialog no longer appears.

Conclusion

Patching Flutter applications for security analysis is a multi-step process. While reflutter solves the initial challenge of SSL pinning, we must be prepared to face secondary defenses like commercial anti-tampering solutions. PairIP's integrity check is a common example of such a defense.

By leveraging the targeted **pairipfix** LSPosed module for a clean, non-invasive hook, or by using the broader patching capabilities of Lucky Patcher, we can effectively neutralize this roadblock. These methods restore our ability to intercept and analyze network traffic, which is essential for any thorough mobile application penetration test.

It's important to note that these techniques are generally effective against passive integrity checks or those easily bypassed by dynamic instrumentation.

> *"However, for applications employing strong Runtime Application Self-Protection (RASP), these bypasses may be detected and blocked. RASP actively monitors the application's environment and behavior for signs of tampering (like the presence of hooking frameworks or modified code) and can take countermeasures. Therefore, if your target application utilizes RASP, be aware that more advanced bypass techniques might be required, or these methods may fail.*
>
> ***Disclaimer: The techniques described in this article are for educational and authorized security research purposes only. Do not apply these methods to applications you do not have permission to test."***

Reference:

- https://github.com/Solaree/pairipcore (https://github.com/Solaree/pairipcore)
- https://blog.byterialab.com/reversing-googles-new-vm-based-integrity-protection-pairip/ (https://blog.byterialab.com/reversing-googles-new-vm-based-integrity-protection-pairip/)

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Android # Security # Reverse Engineering